CLAIMS

What is claimed is:

1. A method of controlling the optimization of a complex process having associated operational variables and process outputs, the method comprising the steps of:

defining a series of corrective actions associated with the process;

modeling a relationship between the operational variables and the process outputs measured over time;

for each corrective action, computing a risk reduction associated with the process outputs; and

determining an urgency metric, based at least in part on the risk reductions, for each of the corrective actions.

2. The method of claim 1 wherein the corrective actions comprise maintenance operations.

3. The method of claim 1 wherein the corrective actions comprise part replacements.

4. The method of claim 1 wherein the corrective actions comprise recipe adjustments.

5. The method of claim 1 wherein the relationship between the operational variables and the process outputs is modeled using a nonlinear regression model.

6. The method of claim 5 wherein the nonlinear regression model comprises a neural network.

7. The method of claim 1 wherein the urgency metrics are determined based on a cumulative sum of one or more risk reductions.

8. The method of claim 1 further comprising performing a corrective action based at least in part on the urgency levels.

9. The method of claim 8 further comprising performing a corrective action based at least in part on the cost of performing the corrective action.

10. An article of manufacture having a computer-readable medium with computer-readable instructions embodied thereon for performing the method of claim 1.

11. A system for controlling the optimization of a complex process having associated operational variables and process outputs, the system comprising:

(a) a process monitor for monitoring process outputs over time; and

(b) a data processing device for receiving, from the process monitor, data indicative of values of the process outputs, and determining the urgency levels for one or more corrective actions based on (i) a risk reduction associated with the process outputs, and (ii) a relationship between the operational variables and the process outputs.

12. The system of claim 11 further comprising an optimizer for determining one or more corrective actions, based at least in part on the risk reductions.

13. The system of claim 12 wherein the optimizer is part of the data processing device.

14. The system of claim 11 further comprising a process controller, responsive to the optimizer, for initiating one or more corrective actions.

15. The system of claim 11 further comprising a database module for storing at least one of target process metrics; corrective action costs; process state information; and possible corrective actions.

16. The system of claim 11 wherein the corrective actions comprise maintenance operations.

17. The system of claim 11 wherein the corrective actions comprise part replacements.

18. The system of claim 11 wherein the corrective actions comprise recipe adjustments.